Earth Observations for Climate-Ready Aquaculture Management and Siting to Improve Food Security and Ocean Health in Palau, a Small Island Developing State

Robert Jones – Global Lead, Aquaculture
Jonathan MacKay – Spatial Scientist, Aquaculture
Heidi Alleway – Global Aquaculture Scientist

The Nature Conservancy

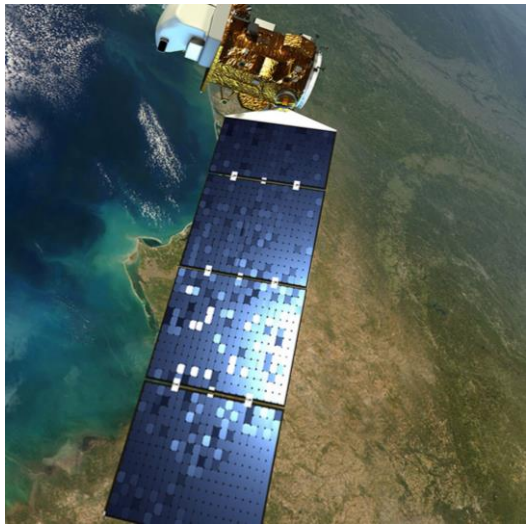
NASA

Photo: Jez O'Hare

Palau

- Small Island Developing State
- Strong environmental ethic
- Declining fisheries and limited arable land
  - Imports ~86% food resources
- Strong aquaculture interest and initial infrastructure in place, hatcheries, demonstration scale aquaculture
- *Challenge*: where to permit aquaculture ensure environmental sustainable and resilient to climate change

Our Approach



1 Partner with government managers, industry and stakeholders

- Collaborative interactive meetings bringing together sectors historically at odds

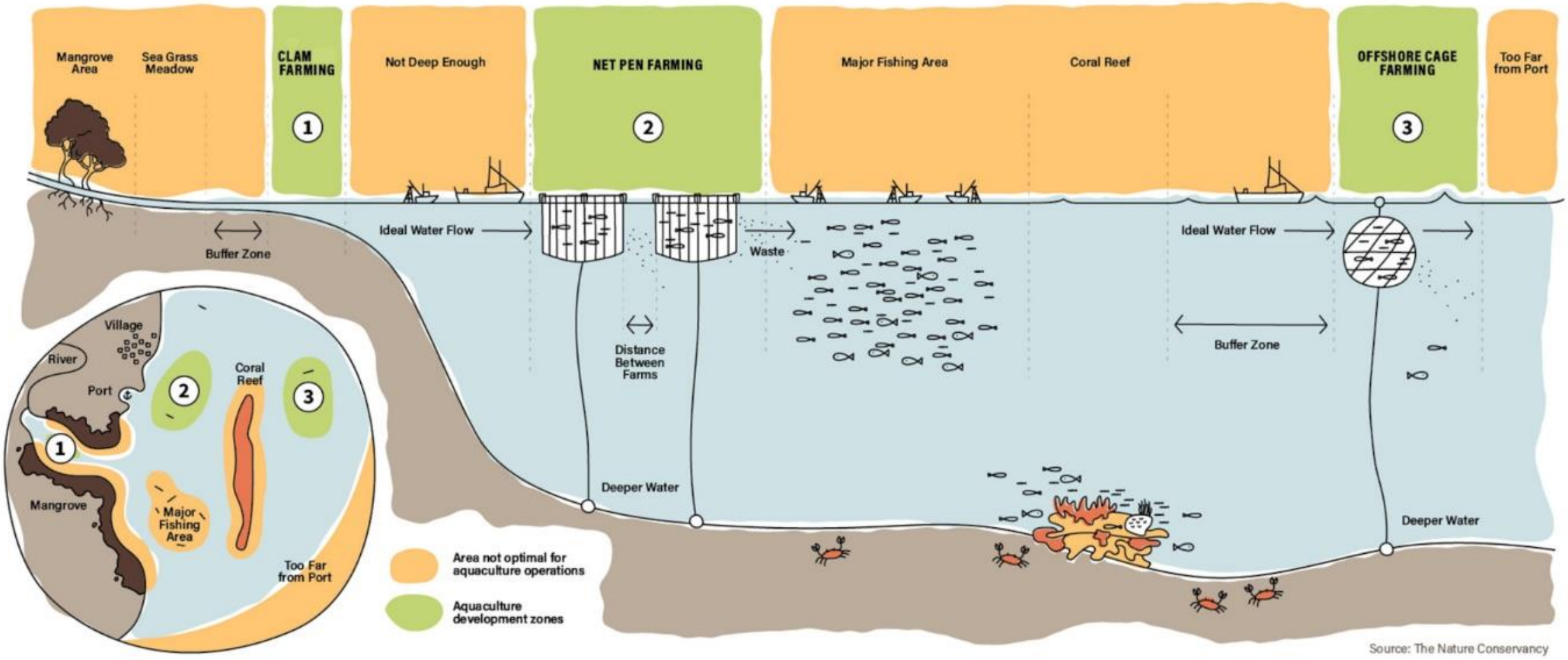
2 Develop comprehensive data and mapping tools

- Scientific methods utilizing advanced Remote Sensing and NASA/NOAA Satellite imagery
- Comprehensive, data-driven modelling of areas for aquaculture

3 Build long term capacity within countries to sustain management capability

- Develop siting 'Guidelines', open access background / guidance document
- Training program on **conservationtrainings.org** platform

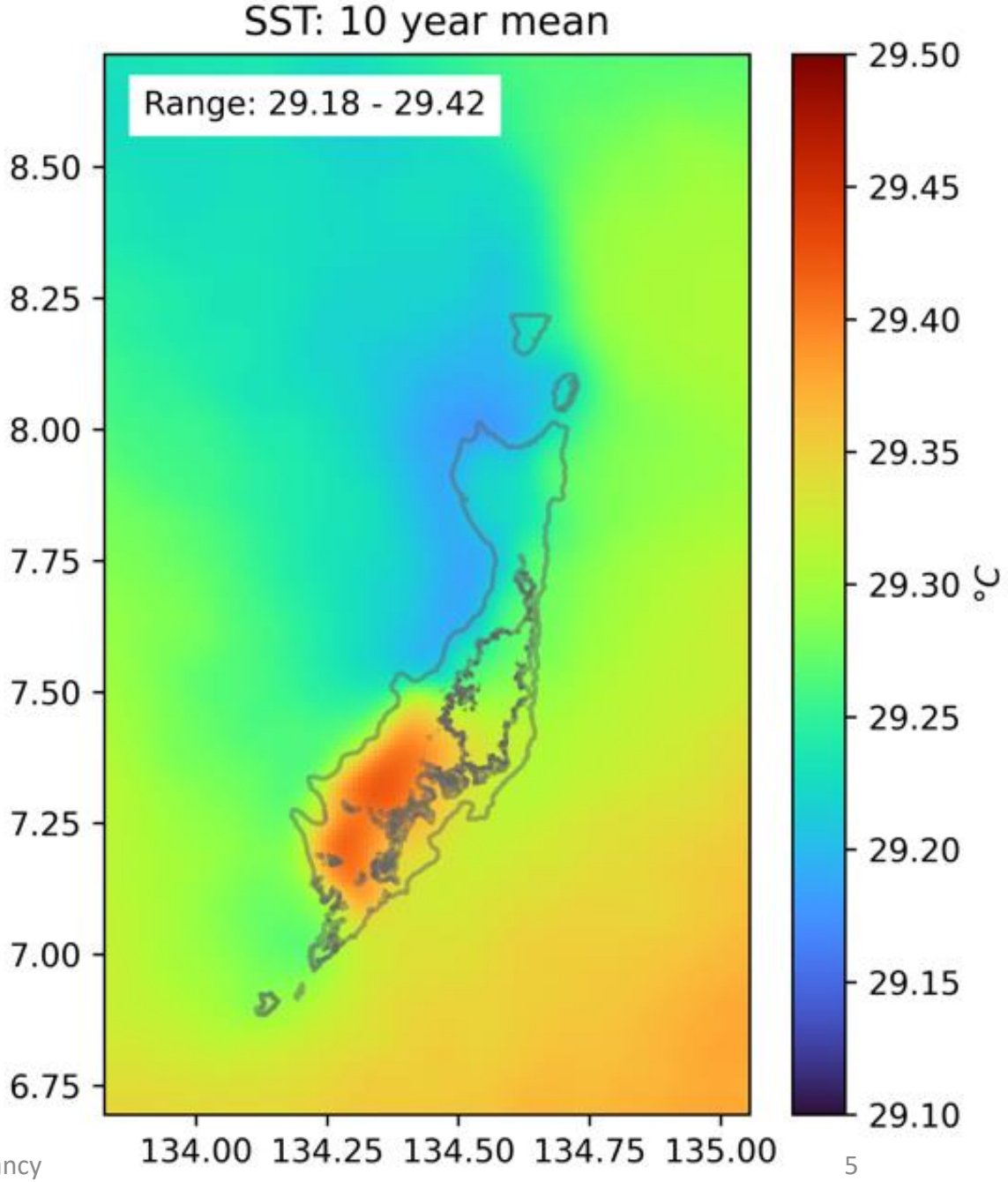
SETTING UP MARINE AQUACULTURE FARMS IN PALAU



Suitability Analysis

35 data layers across 5 categories:

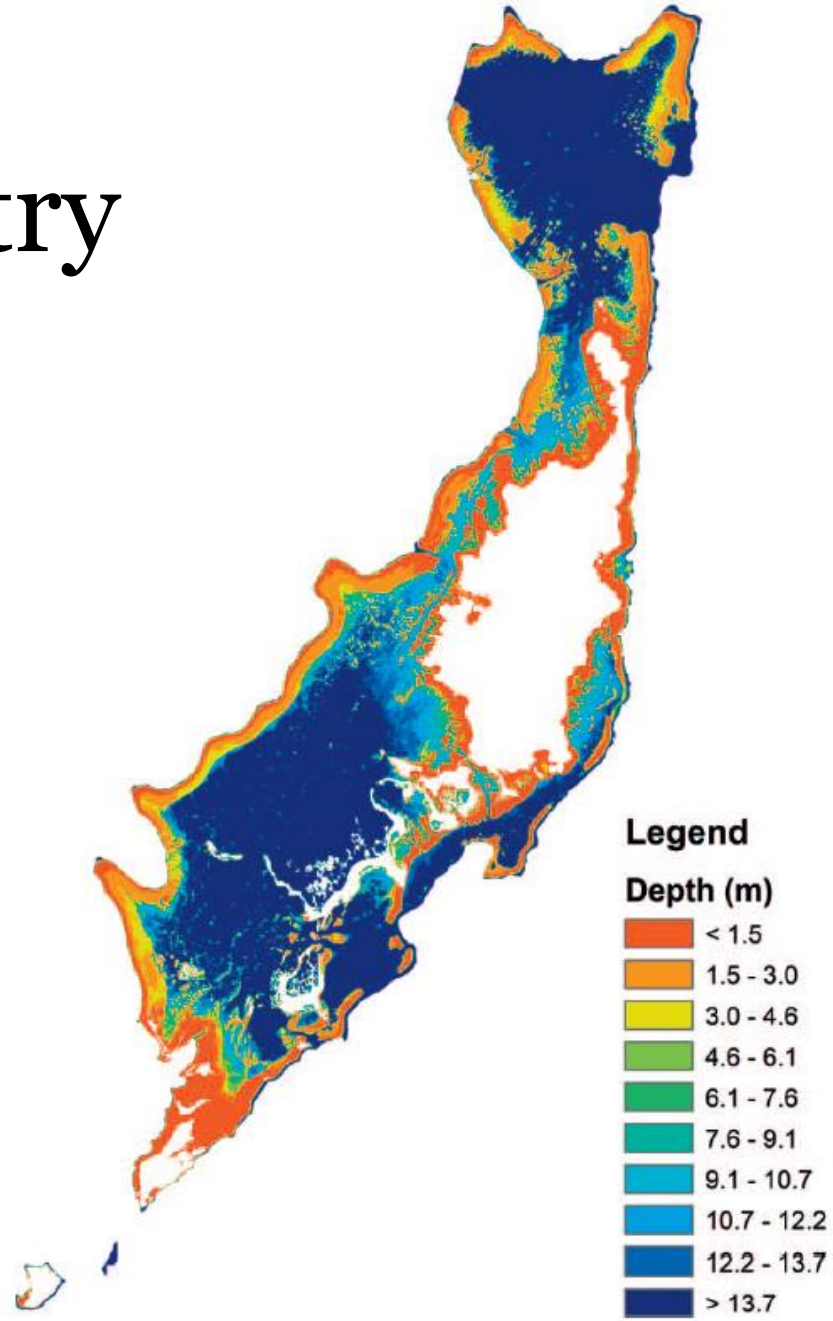
- Environmental
- Natural Resources
- Social Cultural
- Infrastructure
- Climate Change



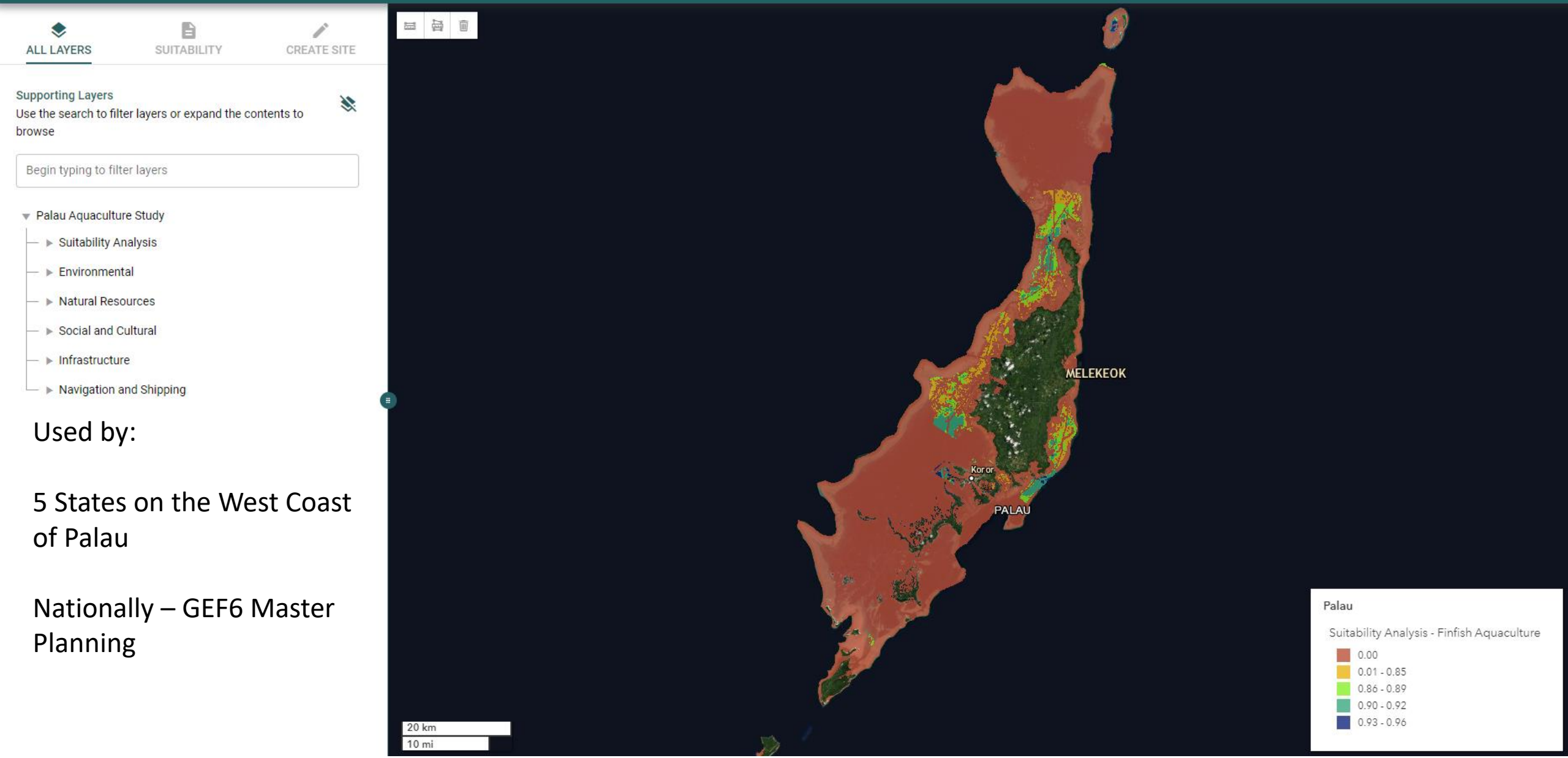
Satellite Derived Bathymetry

- Combining 20 Landsat-8 images and ground truthed data
- Published in Journal of Coastal Research

https://doi.org/10.2112/JCOASTRES-D-20-00032.1



Palau Aquaculture Suitability



Used by:

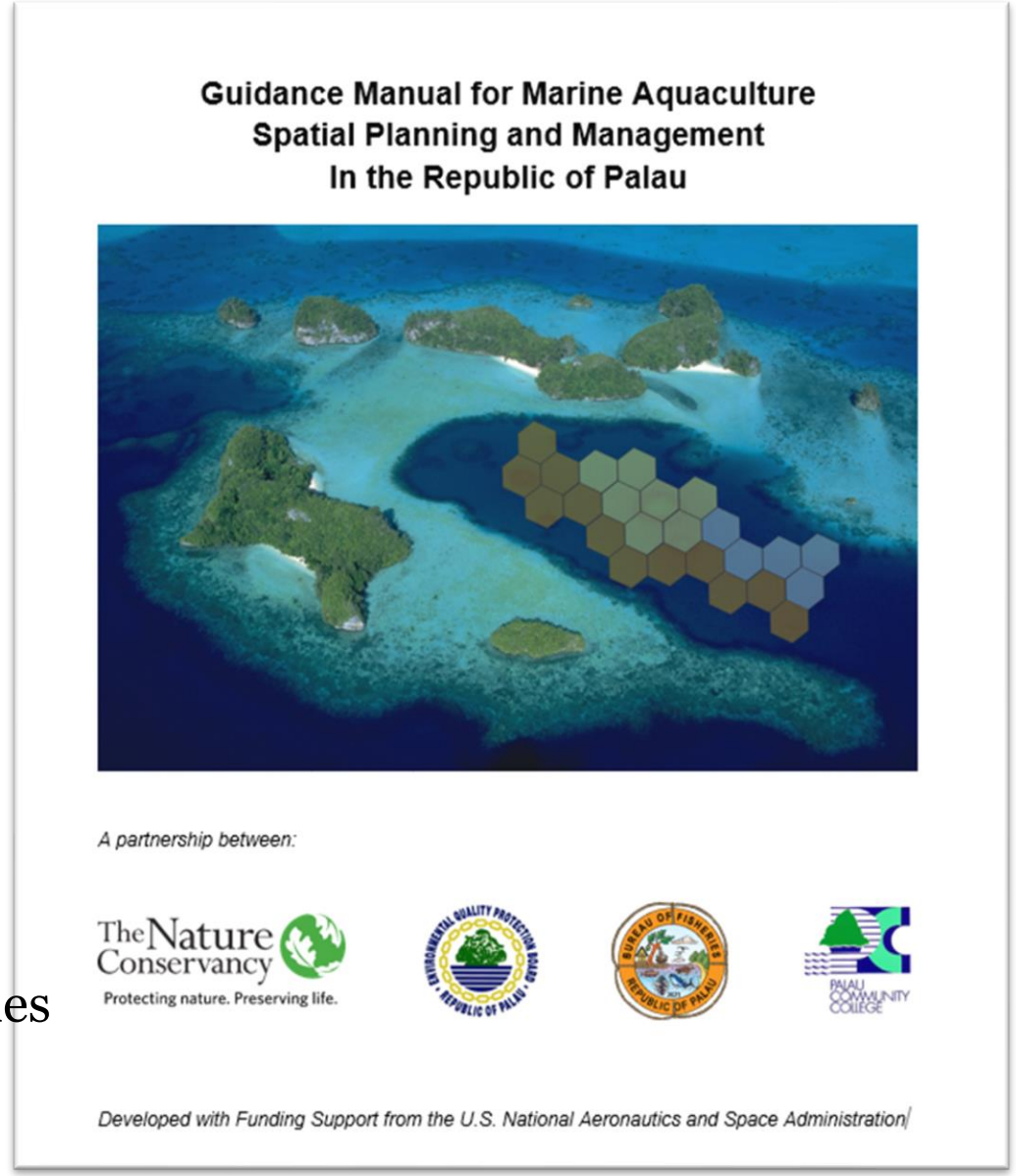
5 States on the West Coast of Palau

Nationally – GEF6 Master Planning

Guidance Document

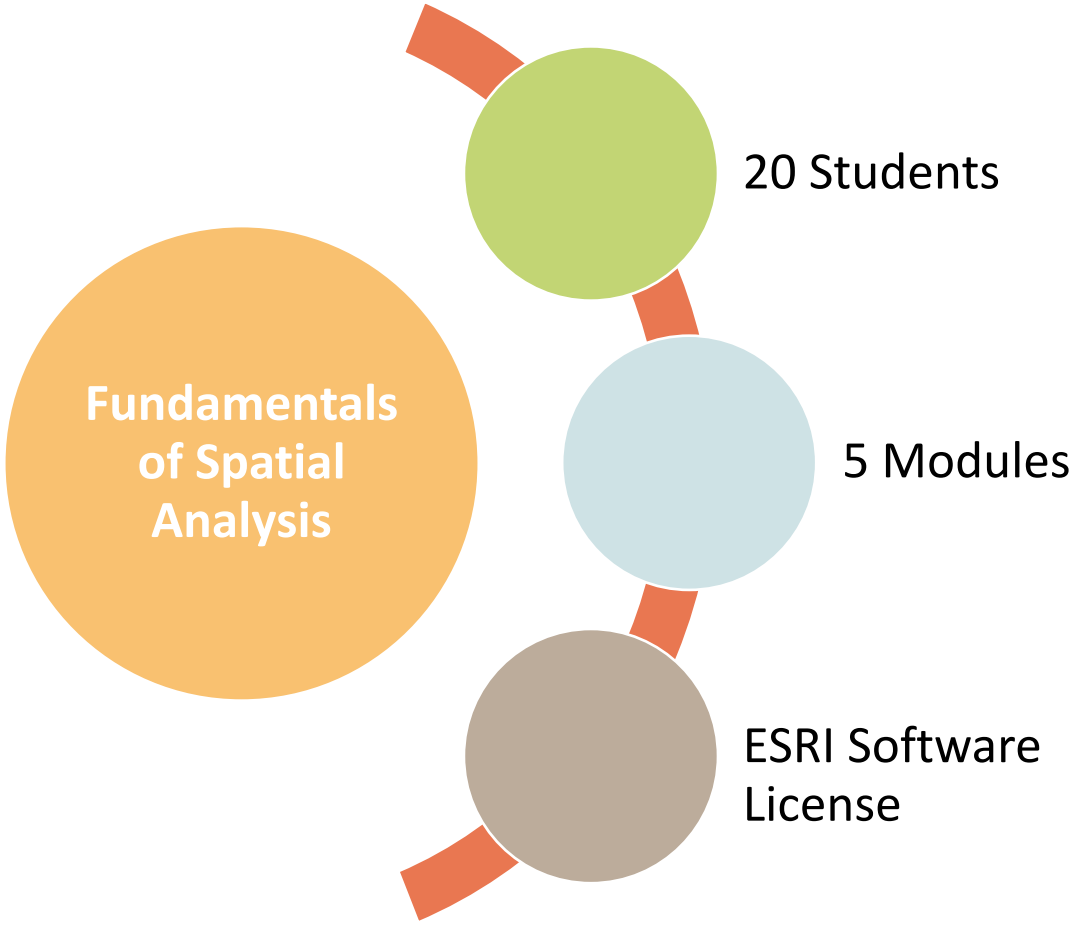
Jointly developed with Palau Government – input from other stakeholders

- International Guidance/Best Practice
- Global Case Studies – Philippines and SA
- Palau aquaculture situation analysis
- Guidelines for spatial analysis
- Methods used and rules for spatial analysis
- Aquaculture management, policies, and opportunities



Training

- 20 students
- 5 modules
  - Fundamentals of Spatial Analysis
  - Fundamentals of Remote Sensing
  - Data management, processing, and visualization
  - Palau siting and spatial analysis
  - Webmaps



PROVIDE FOOD AND WATER

Aquaculture siting // New Work

In 2022, TNC launched new siting projects in critical geographies: Mexico and the African Great Lakes building upon Palau mode.

The Nature Conservancy

Plans to Scale// Priority Geographies: 10 x 2030

We assessed indicators of environmental health, aquaculture production, seafood consumption, social resilience (food insecurity & climate vulnerability), and economic influences, identifying 17 countries that would immediately benefit from investment in a smart growth approach.